

A Guide to Creating Visuals in Plot.ly

Create Plot.ly Account

1. Follow the link <https://plot.ly>
2. Click **Free Sign Up** in the top right corner
3. Enter your email and a username and password under Create Account

Prepare Data

1. Put all of the data needed for your visual in the necessary format in an Excel spreadsheet.
2. Use Excel functions to produce any additional parameters that you want to display such as a moving average, standard deviation, or sum.

The ICNet REU team created visuals that displayed a moving average and standard deviation of the models used in each emissions scenario. The visuals they created required them to put all of the data from both emission scenarios into one spreadsheet for each parameter. Below is an example of that spreadsheet. Only a portion of the years and models are displayed in order to show the set up of the columns.

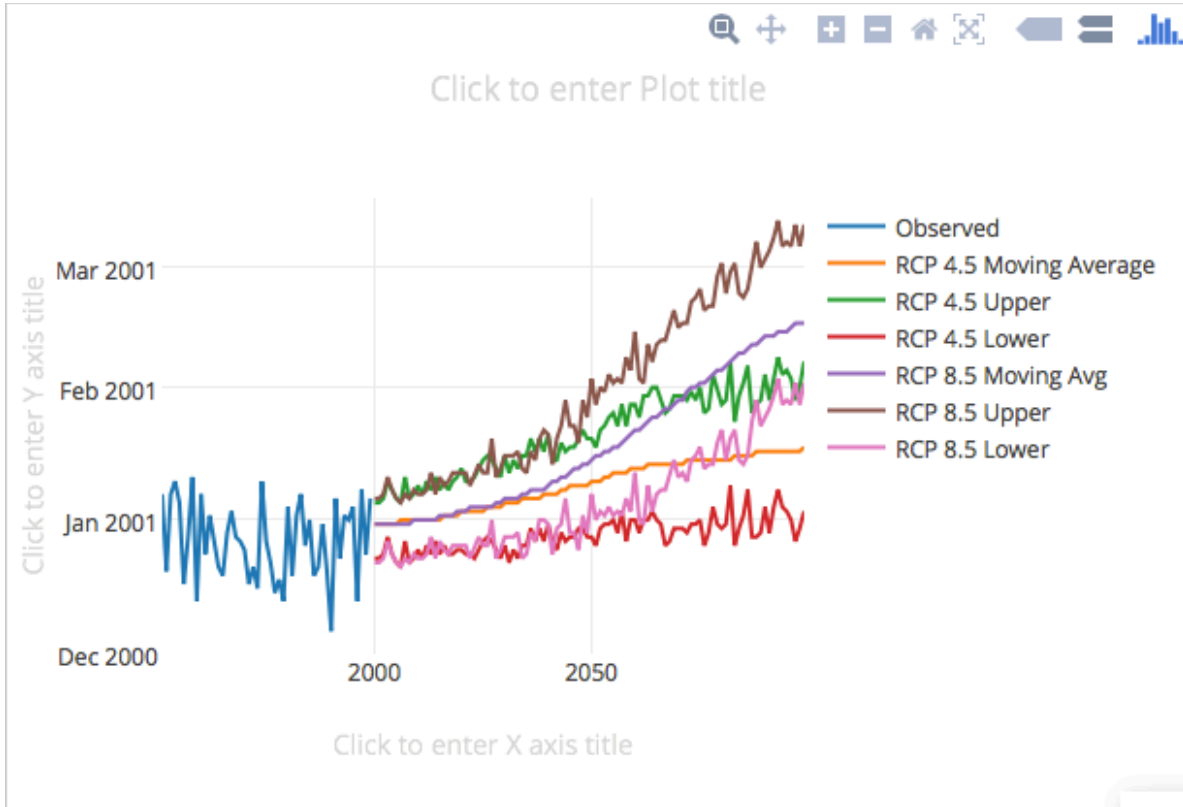
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	
1	Year	Observed	RCP 4.5 Model 1	RCP 4.5 Model 2	RCP 4.5 Model 3	RCP 4.5 Avg	RCP 4.5 Moving Avg	RCP 4.5 Std Dev	RCP 4.5 Moving Avg	RCP 4.5 Upper	RCP 4.5 Lower	RCP 8.5 Model 1	RCP 8.5 Model 2	RCP 8.5 Model 3	RCP 8.5 Avg	RCP 8.5 Moving Avg	RCP 8.5 Std Dev	RCP 8.5 Moving Avg	RCP 8.5 Upper	RCP 8.5 Lower	
2	1992	5/14/01																			
3	1993	5/11/01																			
4	1994	5/21/01																			
5	1995	5/3/01																			
6	1996	5/19/01																			
7	1997	5/6/01																			
8	1998	4/17/01																			
9	1999	4/17/01																			
10	2000		4/26/01	5/1/01	5/11/01	4/25/01	4/25/01	10.44734	9.430978	5/4/01	4/15/01	5/5/01	5/5/01	5/7/01	4/25/01	4/25/01	10.4473	9.2824311	5/4/01	4/15/01	
11	2001		4/28/01	4/20/01	4/26/01	4/26/01	4/25/01	7.882447	9.383808	5/5/01	4/16/01	4/24/01	4/20/01	4/25/01	4/28/01	4/25/01	7.12959	9.2103206	5/7/01	4/18/01	
12	2002		5/5/01	4/27/01	4/20/01	4/27/01	4/25/01	8.86307	9.348901	5/6/01	4/17/01	5/2/01	5/8/01	4/29/01	4/27/01	4/25/01	8.79625	9.3591021	5/6/01	4/17/01	
13	2003		5/8/01	5/1/01	5/2/01	4/25/01	4/25/01	8.187891	9.338017	5/4/01	4/15/01	4/16/01	4/17/01	5/2/01	4/25/01	4/25/01	7.85111	9.4881723	5/4/01	4/15/01	
14	2004		5/3/01	4/6/01	5/12/01	4/30/01	4/24/01	12.30094	9.658684	5/9/01	4/20/01	5/10/01	4/29/01	5/9/01	4/29/01	4/24/01	11.9556	9.4573384	5/8/01	4/19/01	
15	2005		5/4/01	4/21/01	5/4/01	4/27/01	4/24/01	10.40882	9.620748	5/6/01	4/17/01	4/25/01	4/22/01	5/9/01	4/26/01	4/24/01	10.0332	9.6954762	5/5/01	4/16/01	
16	2006		5/1/01	5/9/01	5/1/01	4/26/01	4/24/01	9.330497	9.786599	5/5/01	4/16/01	5/1/01	5/5/01	4/28/01	4/29/01	4/24/01	6.73931	9.8951624	5/8/01	4/19/01	
17	2007		4/6/01	5/11/01	4/17/01	4/20/01	4/24/01	9.074331	9.632151	4/29/01	4/10/01	4/23/01	4/21/01	5/2/01	4/26/01	4/24/01	8.57943	9.9491455	5/5/01	4/16/01	
18	2008		4/22/01	5/2/01	5/11/01	4/28/01	4/24/01	8.317788	9.504848	5/7/01	4/18/01	4/2/01	4/10/01	4/30/01	4/22/01	4/23/01	11.4357	10.071203	5/2/01	4/11/01	
19	2009		5/6/01	4/2/01	5/5/01	4/25/01	4/24/01	10.68849	9.667545	5/4/01	4/15/01	4/20/01	4/23/01	4/24/01	4/25/01	4/23/01	7.96843	10.29048	5/5/01	4/14/01	
20	2010		4/26/01	4/20/01	5/4/01	4/24/01	4/24/01	8.239154	9.656262	5/3/01	4/14/01	4/18/01	4/23/01	4/24/01	4/22/01	4/23/01	11.1708	10.345453	5/2/01	4/11/01	
21	2011		4/10/01	4/29/01	4/13/01	4/24/01	4/23/01	8.864945	9.636791	5/3/01	4/14/01	4/23/01	5/8/01	4/25/01	4/23/01	4/23/01	8.4171	10.399806	5/3/01	4/12/01	
22	2012		4/12/01	4/28/01	4/18/01	4/21/01	4/23/01	8.930014	9.772653	4/30/01	4/11/01	5/8/01	4/13/01	4/14/01	4/25/01	4/23/01	11.1445	10.469154	5/5/01	4/14/01	
23	2013		4/30/01	4/25/01	4/15/01	4/22/01	4/23/01	9.196531	10.12494	5/2/01	4/11/01	4/13/01	3/31/01	4/7/01	4/19/01	4/22/01	11.1661	10.597891	4/29/01	4/8/01	

3. Properly label all columns and rows.
4. Save file to your computer in an easily accessible place.

Importing Data

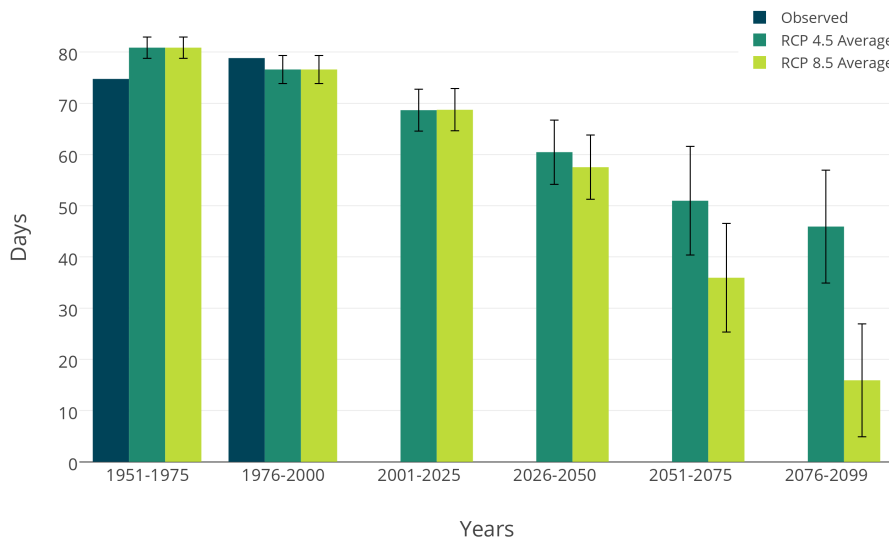
1. Click **New Project** in the top right-hand corner.
2. Click **Add Data** in the top left corner.
3. Select the Excel file that you formatted and saved to your computer.
4. If offered the option to save your file, do so.

- Click **Make A Plot** above the grid and select the kind of graph you want to make. Most of the graphs created by the REU group were line plots. The initial line graph the REU team had produced at this stage looked like this.

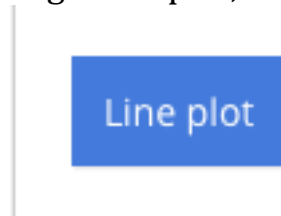


- Select the columns that you would like to plot by clicking **choose as x** or **choose as y** above the headings. The REU group graphed the Year, the Observed data, the Moving Avg, and the Std. Dev. Moving Avg of each emissions scenario.
- You can experiment with other components of the graph under the Options list on the left. For example, the REU team used the Error Bar option to plot the standard deviation on top of the average in this bar graph.

Historical and Projected Length of Freezing Seasons in Madison, ME Based on RCP 4.5 and RCP 8.5



8. Once you have selected all of your data click the blue button labeled with the kind of visual you are creating on the left-hand side. For example, if you are creating a line plot, the button will appear as follows.

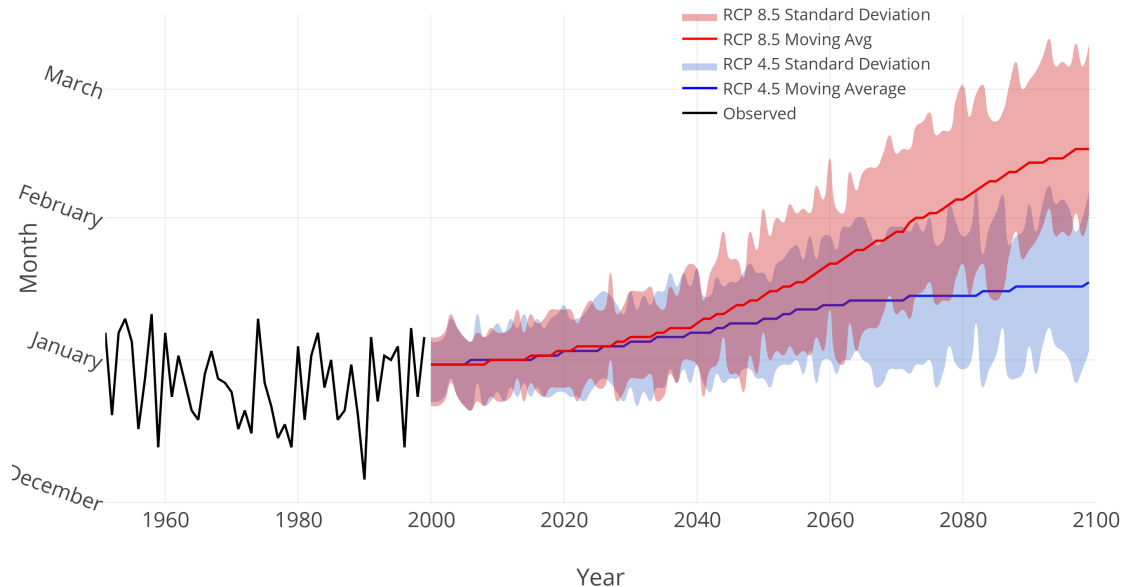


Finalizing Visual

1. You can experiment with the format and layout of your graph with the options in the toolbar above the visual. Experiment with the format and colors of the lines, dots, bars, etc. in **Traces**. Edit the size and layout of the visual under **Layout**. Play with the format of the legend under **Legend**. Change the axes sizes, ticks, fonts, range, etc. under **Axes**. Add a note to your visual under **Note**. Change the theme of your graph under **Themes**. If you like a theme and want to use it in the future, click **Save Theme** on the top left of the theme options. There are so many options to choose from and experiment with in Plot.ly. Check out <http://help.plot.ly> for help formatting or editing your graphics.

After experimenting with trace colors, the layout, fonts, and the legend, the REU team produced visuals like this one.

Historical and Projected Dates the CFI Threshold is Exceeded in Madison, ME Based on RCP 4.5 and RCP 8.5



2. When your visual is complete save it to your Plot.ly account by clicking **Save** in the toolbar and then assigning it a name in the pop-up window. Saving it to your account allows you to come back to the graphic and edit it, or the data you entered into it later on. In order to access your saved visuals click the **Organize** tab at the top of the Plot.ly page.
3. If you want to save the visual to your computer click **Export** in the toolbar. Select your desired format, size, and resolution, and then click download.
4. If a pop-up window asks you if you are sure you want to leave the page, say yes.
5. How you save the visual depends on what kind of computer you have. The document will either automatically download, in which case you can open and save it in the name or place you desire, or it will pop open to the full visual in the web page. If it pops up in the web paper, right click it and hit save image and then save it to your computer.